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Oral communications*English version*

CO05-001-e

Acalculia within brain damage patients: Normalization and validation of a numerical cognition evaluation tool (ECAN)

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Numerical cognitive disorders in brain lesion patients were less studied than aphasia. In 1929, Berger distinguished primary acalculia from secondary acalculia due to other cognitive disorders. Hecaen et al. (1961) proposed to differentiate three syndromes: aphasic acalculia, spatial acalculia and anarithmetia. Then, different cognitive model were developed: Deloche and Seron (1982); McCloskey and Caramazza (1985); Dehaene and Cohen [1]. Their influence on clinical literature will be discussed.

No tool in French Language was available in reference to these cognitive models. We adapted and modified the Number processing and calculation from Delazer et al. [2]. This new tool is made of 37 tasks organized in four categories (A. Numbers; B. Transcodage; C. Calculation; D. usual knowledge). Measures concerned both performance and duration of the task. The normative data concern 423 healthy controls (195 men and 228 women) of four age groups (18–39 years, 40–54 years, 55–69 years, > 70 years) and three educational level groups.

A group of 49 patients with Alzheimer disease was evaluated. There are differences between patients and 89 controls for most of the task, both for performance and duration.

The anatomico-functional model of Dehaene and Cohen (Triple code, Dehaene, 1992) suggests an analogical system and a symbolic system, more related to language. Their uses in clinical practice have not been frequently evaluated. In a stroke patient study, we found that this distinction seems clinically relevant. This lead to considered modular dissociation in some cases that will be presented.

References

[1] Dehaene S. Varieties of numerical abilities. *Cognition* 1992;44:1–42.

[2] Delazer M, Girelli L, Granà A, Domahs F. Number processing and calculation – normative data from healthy adults. *Clin Neuropsychol* 2003;17:331–50.

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What are the criteria for detecting accident-prone brain-injured drivers?

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Resuming driving after a brain injury is a delicate question. Indeed, there are currently no reliable and unanimous criteria for the assessment of driving abilities. If professionals use more often driving simulators, the advice given to the patient still depends on the subjectivity of the person who assesses the driving task and on the simulated scenarios, which are often arbitrarily

developed and very risky, even for drivers without brain damage. To overcome this problem, we have developed driving scenarios involving cognitive processes that are often impaired in brain-injured people (e.g., attentional processes, anticipation, planning). Three driving scenarios were created to simulate an urban road, a rural road, and a rural road at night. These scenarios shared 17 critical events that were designed to generate avoidable accidents in the normal driving population. Upon an event, one of two things could occur, an accident, or an inappropriate behaviour, in which case it was possible to identify the underlying cognitive deficits on the basis of objective indicators (e.g., reaction time, visual exploration, time to contact).

These scenarios have been validated on a sample of ten brain-injured people (severe traumatic brain injury, cerebral vascular accident or aneurysm rupture); six were tested one year after the injury, and four were tested more than ten years after the injury. They were in a coma for at least 48 hours and had a score of 8 or lower on the Glasgow coma scale (GCS). All participants were experienced drivers before the injury and had driven regularly on all road types. This sample was compared to a control sample of nine participants that was equivalent in terms of age and driving experience.

Of the 17 events, five resulted in an accident for many of the brain-injured participants. Brain injured people caused 18 accidents, whereas only one accident was caused by a control participant. The other scenarios helped to identify accident-prone participants whose cognitive deficits induced a mismanagement of critical events (e.g. slow decision-making despite good attentional processes).

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History of traumatic brain injury among prisoners: Preliminary results of a prevalence survey

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Keywords: Traumatic brain injury; Prison; Inmates; Brain injury

Introduction.– Traumatic Brain Injury (TBI) can be responsible of cognitive, behavioral and social difficulties. A Finnish controlled study published in 2002 [1], has highlighted that a history of TBI in childhood or adolescence was significantly associated with psychiatric disorders and crime in male subjects. A descriptive qualitative and quantitative study has been conducted at Fleury-Mérogis state prison between November 2, 2012 and January 31, 2013.

Objective.– The objectives of this study were:

- to establish the prevalence of self reported TBI in a prison population;
- to compare the prevalence of TBI among incarcerated population and the general population;
- to study the links between TBI, epilepsy and incarceration taking into account the age of onset of the TBI.

Methodology.– A questionnaire was completed by a nurse or a doctor with all the subjects entering the custodial system (on voluntary basis) at Fleury-Mérogis state prison. The questionnaires were completely anonymized at the time they were filled.

Results.– One thousand one hundred and ninety-six questionnaires were collected. Forty-eight of them had to be removed due to a refusal to participate or incomplete information more often because of the language of the detainee. One thousand one hundred and forty-eight questionnaires were analyzed with a population of 934 men, 88 women and 69 juveniles (boys and girls). The overall prevalence of reported history of TBI in this population was 30.6%. The two most common causes of TBI were road accident and fights. Seventeen percent of those who reported a history of TBI are followed by a medical doctor.

Conclusion.– The preliminary results of this survey should have consequences such as improvement of screening in this population and better follow up.

Reference

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Rehabilitation, vocational and medico-social care after a severe traumatic brain injury (TBI), and their predictors: Results from the Paris-TBI study



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Keywords: Traumatic Brain Injury; Care utilization; Care pathways; Outcome
Objectives.– To describe care utilization after acute care discharge and its determinants.

Method.– Prospective four-year follow-up of adults with a severe TBI in the Parisian area, through the Paris-TBI study. Out of 504 patients recruited from 2005 to 2007, 245 survived at four years, 147 were evaluated. Patient outcome, type and duration of several cares were assessed.

Results.– Patients (mean age 33 years, 80% men) were severely disabled for 31%, moderately disabled for 39%, and had a good recovery for 27%. They had received the following cares: physiotherapy (78% of patients), speech therapy (68%), psychotherapy (50%) and occupational therapy (42%). Follow-up by a PMR physician or neurologist concerned 63% of patients, and vocational follow-up 23%. Social compensation files had been completed for 59%. In univariate and multivariate analyses, injury severity and outcome on the GOS-E scale were the main predictors of care utilization. Physiotherapy, speech therapy and psychotherapy were more frequent for patients with specific disabilities (respectively motor, speech/swallowing impairments and depression). Care utilization was not significantly associated with cognitive impairments. Patients who had a vocational follow-up were younger, less disabled in daily living activities, and with predominantly intermediate GOS-E scores. Social compensation files were strongly related to all kind of deficiencies, and to a lower educational level. Geographical access to care variables did not seem to influence care utilization.

Discussion.– Paramedical care utilization was related to corresponding deficiencies, excepted for cognitive impairments. Medico-social care was frequently insufficient.

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Impairment and quality of life four years after a severe traumatic brain injury: Results from the Paris-TBI study



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Keywords: Traumatic Brain Injury; Cognitive and comportemental disorders; Quality of life; Outcome

Objectives.– To describe physical, cognitive and behavioral disorders and study quality of life 4 years after a severe traumatic brain injury. Study the prognostic factors of outcome and quality of life's determinants.

Methods.– Prospective four-year follow-up of adults with a severe TBI in the Parisian area, through the Paris-TBI study. Out of 504 patients recruited from 2005 to 2007, 245 survived at four years, 147 were evaluated.

Total disability was assessed via the GOS-Extended.

Cognitive sequelae were assessed with the questionnaire DEX and the Neurobehavioral rating scale-revised (NRS-R).

Quality of life was assessed with the EuroQol scale and the Qolibri questionnaire.

Results.– Patients (mean age 33 years, 80% men) were severely disabled for 31%, moderately disabled for 39%, and had a good recovery for 27%. According to the DEX questionnaire, the cognitive and behavioral difficulties the most frequently observed are impulsivity, disinhibition, planning problems, distractibility and making decisions difficulties.

Age and level of education are correlated with recovery level (GOS-E), while sex and familial situation were not predictive.

Age and level of education are correlated too with the importance of cognitive disorders found to NRS-R.

Other statistical analyzes are underway that explore the relationship between sequelae and quality of life, together with outcome's prognostic factors.

Discussion.– Factors influencing outcome and quality of life are complex. It is important to study.

Further reading

Mc Cauley, et al. The Neurobehavioral Rating Scale-Revised: sensivity and validity in closed head injury assessment. *J Neurol Neurosurg Psychiatr* 2001;71:643–51.

Truelle JL, et al. Quality of life after traumatic brain injury: the clinical use of the QOLIBRI, a novel disease-specific instrument. *Brain Injury* 2010;24(11):1272–91.

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